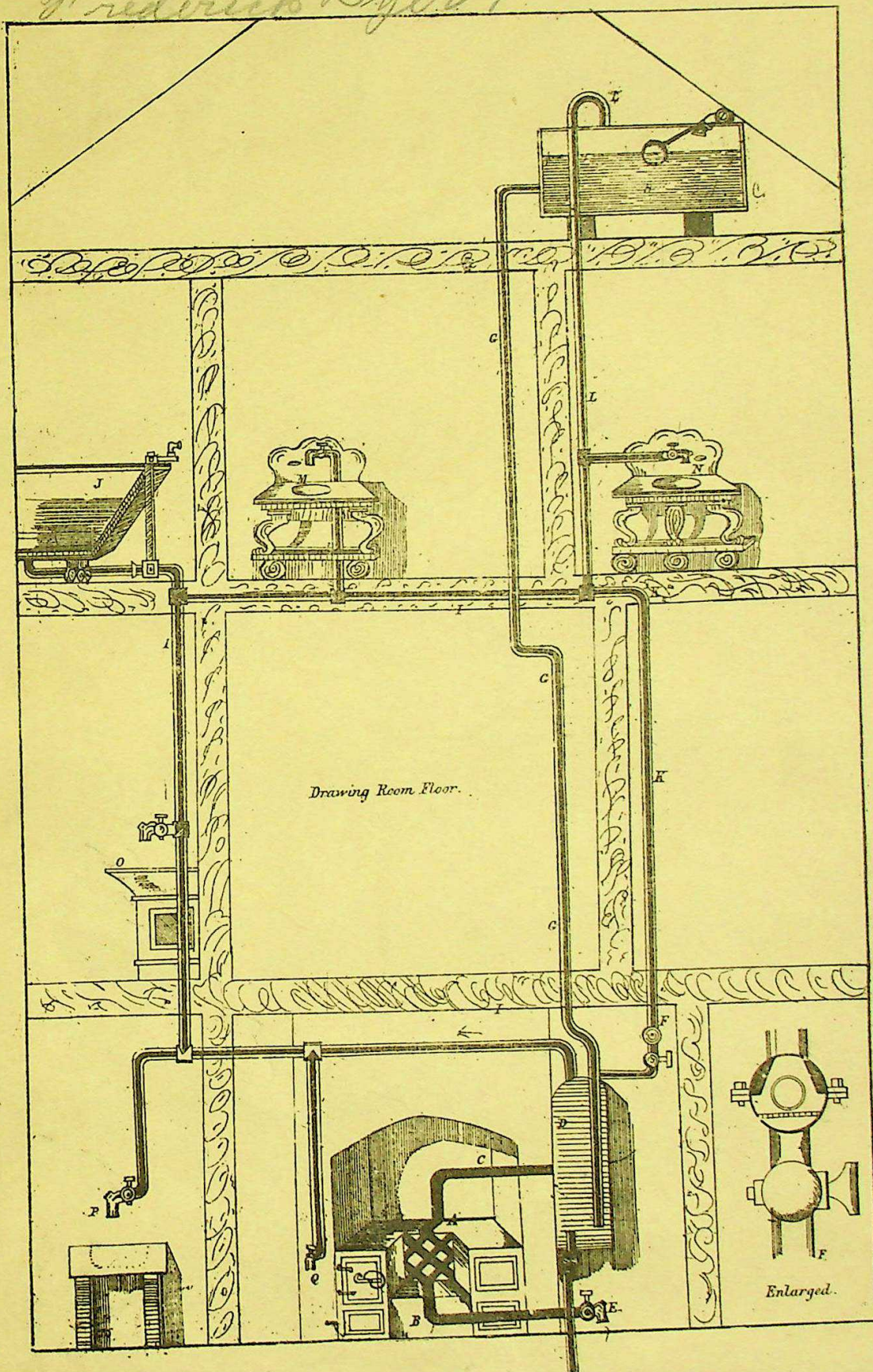


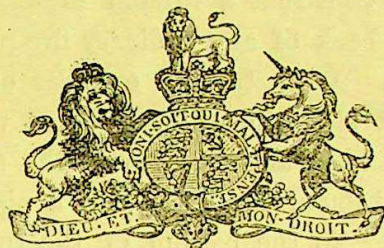
1 Sheet.

2888 of 1868.

Frederick Dyer.







A.D. 1868, 19th SEPTEMBER. N° 2888.

**Apparatus for Supplying Hot Water.**

**LETTERS PATENT** to Frederick Dyer, of No. 66, High Street, Camden Town, in the County of Middlesex, for the Invention of "IMPROVEMENTS IN THE METHOD OF AND APPARATUS FOR SUPPLYING BATH ROOMS AND OTHER PARTS OF DWELLING HOUSES AND SIMILAR BUILDINGS WITH HOT WATER."

Sealed the 12th March 1869, and dated the 19th September 1868.

**PROVISIONAL SPECIFICATION** left by the said Frederick Dyer at the Office of the Commissioners of Patents, with his Petition, on the 19th September 1868.

I, FREDERICK DYER, of No. 66, High Street, Camden Town, in the County of Middlesex, do hereby declare the nature of the said Invention for "IMPROVEMENTS IN THE METHOD OF AND APPARATUS FOR SUPPLYING BATH ROOMS AND OTHER PARTS OF DWELLING HOUSES AND SIMILAR BUILDINGS WITH HOT WATER," to be as follows :—

The object of this Invention is to enable water to be heated in a very short time, and maintained at a high and almost equal temperature throughout all parts of the apparatus with a small fire, whereby a large saving of fuel is effected, and to remove all danger of explosion. To



*Dyer's Impts. in Apparatus for Supplying Hot Water to Bath Rooms.*

attain these objects I construct a tubular fire-back or coil of pipes, which I place at the back of any ordinary fire-place which does not connect with a boiler. I construct a cylinder of any kind of sheet metal and of sufficient strength, which I place vertically and higher than the tubular fire-back in any recess near the fire-place. I connect this cylinder and the tubular fire-back with a pipe leading from the bottom of the cylinder to the bottom of the tubular fire-back. In this connecting pipe at its lowest part I leave a tee piece with a cock for the purpose of cleaning the whole apparatus when it is necessary to do so. I lead another pipe from the cylinder about fifteen or twenty inches from the bottom to the top of the tubular fire-back. The action of the fire upon the water in the tubular fire-back causes it to flow into the cylinder, and its place is supplied by the lower pipe with colder water, and thus a continual circulation is maintained. The surface of the tubular fire-back exposed to the fire is extensive, the flames having free access to the whole surface of the tubes, and as there is only a small quantity of water in the tubes at any one time, and it is continually circulating a very short time after the application of fire, the water in the cylinder becomes sufficiently hot for any practical purpose. The cylinder is supplied with cold water from the cistern at the top of the house with a pipe which I call the cold water pipe. This pipe enters the cylinder at the top. Another pipe, which I call the hot water pipe, draws the hot water supply from the cylinder. This pipe leads from the top of the inside of the cylinder as direct as convenient, to the highest point in the house where hot water is required. The supply is obtained from all parts below by tapping this pipe or by branch pipes leading from it. I lead another pipe, the expansion pipe, from the most convenient part of the hot water pipe to the top of the inside of the cistern, where it is turned downwards. This pipe is always open, so that as the water in the cylinder becomes overheated and expanded it will drip into the cistern. In all other hot water apparatus the water in the pipes leading from the boiler or source of supply when motionless becomes cold, and it is often necessary to draw off the whole contents of these pipes before hot water can be obtained; this difficulty I obviate by means of a pipe which I call the return pipe, which connects with the hot water pipe in the part most convenient, and is brought direct to and connected with the cold water pipe a few inches from the top of the cylinder, or if preferred is led direct to the cylinder, entering the cylinder at the



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top. This return pipe completes the circulation of the water in the whole apparatus. As by a natural law the hottest water rushes upwards, the water in those parts of the hot water pipe adjacent to the taps is the hottest, while there is a continual flow of the colder water through the  
5 return pipe to the cylinder. Thus the water in the whole apparatus will be maintained at almost an equally high temperature. I prevent the possibility of cold water rising in the return pipe by inserting a ball valve in a part of the return pipe near to its junction with the cold water pipe. If the supply of cold water should be stopped by  
10 the cistern becoming empty, by the water in the pipe freezing, or from any other reason, as the hot water pipe leads from the top of the cistern the stoppage of the supply would be immediately known, as water would not flow from the taps when they were turned on, while the cylinder would remain full of water, thus preventing all danger  
15 of explosion.

**SPECIFICATION** in pursuance of the conditions of the Letters Patent, filed by the said Frederick Dyer in the Great Seal Patent Office on the 19th March 1869.

**TO ALL TO WHOM THESE PRESENTS SHALL COME, I, FREDERICK**  
20 **DYER**, of No. 66, High Street, Camden Town, in the County of Middlesex, send greeting.

**WHEREAS** Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Ninteenth day of September, in the year of our Lord One thousand eight hundred and sixty-eight, in the  
25 thirty-second year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Frederick Dyer, Her special licence that I, the said Frederick Dyer, my executors, administrators, and assigns, or such others as I, the said Frederick Dyer, my executors, administrators, and assigns, should at any time agree with, and no others,  
30 from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "**IMPROVEMENTS IN THE METHOD OF AND APPARATUS FOR SUPPLYING BATH ROOMS AND OTHER PARTS OF**



*Dyer's Impts. in Apparatus for Supplying Hot Water to Bath Rooms, &c.*

DWELLING HOUSES AND SIMILAR BUILDINGS WITH HOT WATER," upon the condition (amongst others) that I, the said Frederick Dyer, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said Frederick Dyer, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The object of this Invention is to heat water in a very short time and to maintain it at a high and almost equal temperature throughout all parts of the hot water apparatus in such manner that a large saving of fuel is effected, and to remove all danger of explosion. To attain these objects I use a fire-back of malleable iron or any other metal cast in one piece from tubes crossed or wrought, or if preferred I use pipes or tubes of any metal or of any form or shape, which I place at the back or side of an ordinary fire-place which may or may not connect with a boiler. I construct a cylinder of any kind of sheet metal and of sufficient strength, which I place vertically and higher than the tubular fire-back in any recess near the fire-place. I connect this cylinder and the tubular fire-back with a pipe leading from the bottom of the cylinder to the bottom of the tubular fire-back. In this connecting pipe at its lowest part I leave a tee piece with a cock for the purpose of cleaning the whole apparatus when it is necessary to do so. I lead another pipe from the top of the fire-back to the cylinder entering the cylinder about fifteen inches from the bottom. The action of the fire upon the water in the tubular fire-back causes it to flow into the cylinder through the upper pipe, and its place is simultaneously supplied by the lower pipe with colder water, and thus a continual circulation is maintained. The flames have free access to the whole surface of the tubular fire-back, and as there is only a small quantity of water in the tubes at one time and it is continually circulating, soon after the application of fire the water in the cylinder becomes sufficiently hot for any practical purpose. The cylinder is supplied with cold water from the cistern at the top of the house by means



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of a pipe which I call the cold water pipe. This pipe enters the cylinder at the top and is carried to within a few inches of the bottom. Another pipe, which I call the hot water pipe, draws the hot water from the cylinder. This pipe leads from the top of the inside  
5 of the cylinder as direct as convenient to any part of the house where hot water is required. I lead another pipe which I call the expansion pipe from the most convenient part of the hot water pipe to the top of the inside of the cold water cistern where it is turned downwards. This pipe is always open so that if the water in the cylinder should become  
10 overheated and expanded it would escape by dripping from this pipe into the cistern. In other hot water apparatus the water in the pipe leading from the boiler or from any other source of supply when not being drawn from is motionless and soon becomes cold, often rendering it necessary to draw off the whole contents of these pipes before hot water  
15 can be obtained; this difficulty I obviate by means of a pipe of smaller size than the others, which I call the return pipe, and which connects with the hot water pipe in the part most convenient, and is brought direct to and connected with the cold water pipe a few inches from the top of the cylinder or if preferred is led direct to the cylinder  
20 entering the cylinder at the top or at the side. This return pipe completes the circulation of the water in the whole apparatus, and as by a natural law the hottest water rushes upwards the water in those parts of the hot water pipes adjacent to the taps is the hottest, while at the least diminution of its heat it flows through the return pipe  
25 to the cylinder. Thus the water in the whole apparatus will be maintained at almost an equally high temperature. I prevent the possibility of cold water rising in the return pipe by inserting a ball valve in a part of the return pipe near to its junction with the cold water pipe. If the supply of cold water should be stopped by the  
30 cold water cistern becoming empty, by the water in the pipe freezing, or from any other cause, the hot water pipe leading from the top of the cylinder, the stoppage of the supply would be immediately known, as water would not flow from the taps when they were turned on, while the cylinder would remain full of water, thus preventing all danger  
35 of explosion.

And in order that my said Invention may be clearly understood I have hereunto annexed a Drawing showing my improved apparatus as in use in a dwelling house.



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A is the tubular fire-back made of malleable iron or any other metal or constructed of pipes or tubes, and is placed at the back of the kitchen fire-grate; D is the cylinder acting as a hot water reservoir or tank, and is made of any kind of durable sheet metal; B is a pipe connecting the bottom of the cylinder D with the bottom of the tubular fire-back A, and by this pipe B the coldest water in the cylinder D being the lowest is conveyed to the fire-back A; C is a pipe connecting the top of the fire-back A with the cylinder D entering the cylinder about twenty inches from the bottom, and conveying the heated water from the fire-back A to the cylinder D; E is a T piece with cock, by means of which the cylinder, the fire-back, and all parts of the apparatus can be cleaned by drawing off when necessary; H is the cold water cistern at the top of the house; and G, G, G, the cold water pipe leading from the cistern H to within a few inches of the bottom of the inside of the cylinder; I, I, I, is the hot water supply pipe leading from the top of the inside of the cylinder D and supplying hot water either direct or by branch pipes to any part of the building where hot water is required; K, K, is the return pipe which conveys the water from the hot water pipes I, I, I, to the cylinder D and thus completes the circulation of the water in the whole apparatus, and prevents the water in the hot water pipes I, I, I, becoming motionless and cool when not being used; F is a ball valve inserted in the return pipe K, K, a few inches from its junction with the cylinder D, and it prevents cold water rushing upwards in the return pipe; L, L, is the expansion pipe leading from the hot water supply pipe I, I, I, to the cistern H, and acting as a safety valve to the whole apparatus by furnishing an outlet for any overheated and expanded water in the cylinder D; J represents a bath supplied with hot water; M and N, wash stands in bed rooms with hot water taps; O is side stand with hot water tap; P, the hot water tap in the scullery, and Q the hot water tap in the kitchen.

Having thus described the nature of my Invention, and the manner in which the same is put into practice, I would have it understood that I do not confine myself to the exact details herein described and set forth; but what I specially claim is,—

Firstly. The use of the tubular fire-back made of malleable iron or other metal cast in one piece from tubes crossed or cast or wrought in any other way, or constructed of pipes or tubes of any form or shape and of any metal, for the purpose as herein-before described.